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$$(1 \div \frac{1}{4}a^2) \int_0^{\frac{1}{2}a^2} \beta db = \frac{4}{a^2} \int_0^{\frac{1}{2}a^2} (\frac{1}{2}a + \sqrt{(\frac{1}{4}a^2 - b)}) db = \frac{4}{a^2} [\frac{1}{2}ab]_0^{\frac{1}{2}a^2} + \frac{4}{a^2} [\frac{1}{3} \sqrt{(a^2 - 4b)^3}]_0^{\frac{1}{2}a^2}$$

$$- \frac{a}{3} = \frac{a}{2} - \frac{a}{3} = \frac{1}{6} a.$$

The mean value of the larger root is, therefore, $\frac{5}{6} a$.

Also solved in a similar manner by *Professors Matz, Zerr, and Draughon*.

14. Proposed by CHARLES E. MYERS, Canton, Ohio.

$\frac{1}{2}$ of all the melons in a patch are not ripe, and $\frac{1}{4}$ of all the melons in the same patch are rotten, the remainder being good. If a man enters the patch on a dark night and takes a melon at random, what is the probability that he will get a good one?

Solution by H. W. DRAUGHON, Ohio, Mississippi, and G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.

Let $12n$ = the whole number of melons in the patch. Then $4n$ are not ripe and $3n$ are rotten. The $3n$ rotten melons may be included in the $4n$ not ripe melons in which case there would be $8n$ good melons, or the $3n$ rotten may not be included in the $4n$ not ripe melons in which case there would be $12n - (3n + 4n) = 5n$ good melons.

$\therefore$ there cannot be less than $5n$ nor more than $8n$ good melons.

$$\therefore \text{ the chance of a good one} = \frac{1}{2} \left(\frac{5n + 8n}{12n} \right) = \frac{13}{24}.$$

$$\text{The chance of a not ripe one} = \frac{1}{2} \left(\frac{n + 4n}{12n} \right) = \frac{5}{24}.$$

$$\text{The chance of a rotten one} = \frac{1}{4} \left(\frac{0 + 3n}{12n} \right) = \frac{1}{8}.$$

$$\text{The chance of a not ripe and rotten one} = \frac{1}{4} \left(\frac{0 + 3n}{12n} \right) = \frac{1}{8}.$$

$$\therefore \frac{13}{24} + \frac{5}{24} + \frac{1}{8} + \frac{1}{8} = 1 \text{ as it should be.}$$

Solutions of this problem were received from *P. S. Berg, F. P. Matz, J. M. Colaw*.

15. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

Todhunter proposes: "From a point in the circumference of a circular field a projectile is thrown at random with a given velocity, which is such that the diameter of the field is equal to the greatest range of the projectile: prove the chance of its falling within the field, is $C = 2^{-1} - 2\pi^{-1}(\sqrt{2} - 1)$, = .236+." Is this result perfectly correct as to fact?

First Solution by the PROPOSER.

Let P be the point from which the projectile is thrown, $AP = 2a$, and $\angle APB = \theta$. Now, if ϕ = the angle of elevation at which the projectile is thrown, and C = the chance for any given value of θ ; then, evidently, the required chance becomes